MR. BROWN: Thanks very much. I'd like to call Dr. Gary Sandquist.

DR. SANDQUIST: Is it necessary that I speak here, or can I address the audience directly?

MR. BROWN: Well, I think if you -- this afternoon -- just speak into the microphone. I think that works.

DR. SANDQUIST: Forgive me. I guess as a university professor I'm kind of a ham. I like to look at the audience rather than the --

MR. BROWN: We're not offended. Go ahead.

DR. SANDQUIST: All right. It is apparent that if Yucca Mountain is realized, and that's still a problem that has to be addressed, has to be technically established, the transportation will be a profound impact on the state of Utah.

But I thought it was kind of interesting, having just heard from Dianne the state's concern and such, and I thought it was rather significant, and I don't mean to pick on the state, but we already have had a very major activity that's going on in the state: I-15 construction. I struggled with getting down here, and most of you have too. And I just kind of went through for some numbers,

and first of all I guess I would express a concern, I am not aware that the state conducted an environmental assessment or an environmental impact statement for that construction activity. It's had a profound impact. Some

of you have business friends and acquaintances. It's had a great disruption on the state of Utah and the risk for the locals and such; but aside from that point of view, I was just thinking that would impress you.

About 20 years ago we had a major irradiation site called a vitro site. It was out on 33rd South and about Eighth West. There were two million cubic yards of spent tailings that were remaining there from previous operations, primarily preparing uranium for the Atomic Energy Commission. Two million cubic yards, had something like 1500 curies of radium source term material. The state decided that that material had to be moved. It was moved to Tooele County and placed there. It's near by Envirocare's facility there.

But I was just making a quick calculation. We have about 25 miles of I-15 construction that's going on, and that's moved something in the order of about two hundred million cubic meters of material. Well, you say, what's that have to do with radioactivity? A major source

of radioactivity from much of these natural soils is radon. And uranium is contained in thorium and natural soils in a few parts per million, and I asked some students to go through some calculations and say, what has been the increased radiation risk associated with this excavation and dumping it on the side and I'm driving on

my way. So what I asked them to do, we haven't done it yet, is take some radiation detectors and walk around the site.

Now, realistically, I deal with radiation every day and we have a research reactor. I think if you know what you're doing there's no concern of risk to yourself, but it has not been assessed. The state carried this out and we didn't even bring up the issue. We're greatly concerned about the spent fuel as we go across, and rightly so because it is an item that has to be carefully taken care of. But we've been shipping radioactive materials now for 40 years in this country. Something in the order of a hundred million shipments are made yearly. Most of them are medical isotopes, very small levels, no question about it, and they're very essential to us. Nobody is proposing in the state of Utah that we stop medical treatment. The university has a major medical

facility in this case.

But with respect to higher levels of material, for example, University of Utah made shipments of radioactive material to our land disposal. We have radiation detectors out here, and occasionally we make a mistake in the sense a nurse at the hospital puts materials in and the radiation sensors at the disposal site are sensitive enough they're picked up, and we get a

citation over that, and rightly so. We need to be careful about that.

But the truth of it is is that radiation is around us all the time. It's a relative number. Too many critics of it say, well, I don't want a radioactive world, I want a world that's nonradioactive. That's not going to happen. There are significant radiation sources, radon and others, in this very room. We live with it, we have it in our body. So it's a relative degree, and sometimes we imply that the state doesn't want any radiation. Well, fine, but we can't really make that kind of decision. It's too difficult.

2 Anyway, there is concern about transportation, no question about it. We have to recognize it. But it can be done safely. To date, of all the shipments over

the last 40 years, there has never been an identifiable death or injury in the public associated directly with radiation. Now, is that to say that no member of the public has ever got a slightly elevated radiation exposure as a result of traveling on an airplane with a medical isotope? No question about it. But there are lots of things that I can choose that would increase my radiation exposure. I live in a brick home. Radiation exposure is a few percent greater as a choice of that.

I like to fly occasionally. You folks flew out

here to visit us. Radiation levels go up quite dramatically, and I've demonstrated that by taking a radiation detector with me on board. It's almost a pretty good indication of altitude, if you'd like. And we live here in the mountain west at 4,200, 4,500 feet, and we enjoy, or at least suffer a higher level of radiation exposure. Now, if I wanted to reduce it I could move to Los Angeles, but I'd rather not do that. I think they have other problems. So it's sort of a trade-off in our modern society.

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What do we do with this spent nuclear fuel that's sitting at these sites? Well, we've got a couple choices. We can leave it there and forget about it, and

in the political circle that's kind of an easy thing to do. The Clinton administration doesn't really want to face it. There's a proposal to put a temporary site in Nevada, store it as waste and hold it for a while. He threatened to veto it even though many democratic senators supported the issue. Why? It is easier to study it and postpone a difficult decision for another administration.

We need to study it more. We've been studying it now for 40 years or so. Maybe what we need to do, then, even if we did forego nuclear power, we still have that waste to resolve. We have 77 different sites around the country. We can't afford to provide the kind of

coverage that will be covered at one site, Yucca Mountain, and leave it there, which is very irresponsible, in my mind, or do we make some sort of effort to try and put it away for the life of it?

What I'd like to do is close off with one thing. We'd like to think how smart we are and such, but in truth, two billions years ago nature put together a natural reactor in Africa in Gabon Province. The French who were exploring and trying to find uranium sources around the world discovered this, and what they found is, in attempting to identify uranium resources, found fission

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products which had much too short a half life to be geologically at this particular site. So they explored further, and it appears that nature about two billion years ago put water soluble uranium materials and such into a surface river bed and it came together and formed a natural reactor.

You say, wait a minute, I know enough about reactors. Natural uranium can't go critically. But when I backdate and determine the radioactivity of natural uranium two billion years ago, uranium-235 has a concentration about 5 percent. What do I put in light water reactors for criticality today? About 5 percent.

This reactor operated for some hundred million years on the surface of the ground in Africa. So God was

smarter than we. We thought we had done something that he hadn't, and that isn't the case.

Anyway, the reactor operated for a long period of time and it finally shut down, burned out the materials. Question. You say, well, so what? What is the value of that? How far did those fission products over the two billion years move from that surface site? Well, the French did a careful study on it. It appears that the maximum limit for those materials sitting at that

site was a few hundred meters.

Now, if nature capriciously can put together a reactor and put it on the surface of the earth and not move it more than that small distance over two billion years, do you think we can put it underground at a couple of thousand feet and a thousand feet above the ground water and hold it there not for two billion years, but ten thousand years brings the radioactivity level down to below what the natural uranium level was. I think we can. Of course the critics are going to say no, possibly we can't. I think we can.

Finally, as a last close-off here, and I think my time is going to be short here. Why do we need nuclear power? Why did we make that bad mistake? Well, admittedly, for many of us, the people of my age, the problem with nuclear power is that it had a terrible birth

defect. It came into our minds for older people like myself in two atom bombs that ended the war. And for most people, average people in the public, they can't disassociate the fact that weapons are associated with nuclear energy radiation and radioactivity. That's unfortunate, and I've had my colleagues who tell me the only way we're going to see a renaissance in nuclear power

is when old folks like me die off and we've forgotten about it. Maybe that's true.

Younger people at the university say, what's all the furor about? We can see you have to treat nuclear energy safely and handle it, but what's the problem? After we've given them the technical background. And I have to try and remind them, that's the problem. We've even had speakers come on campus and say, we oppose nuclear power because who wants radioactive electricity in our building? I hope you all smiled when I say that. Radioactive electricity?

Anyway, nuclear power is very important. It's about 20 percent of our electrical power in this country. It is the only one that has no greenhouse gas emissions. If we are really serious about greenhouse concerns and effect on weather and changes -- and I think, now, maybe I'm -- I haven't lived very long and I'm narrow minded in a sense -- maybe the weather isn't changing. Maybe we

aren't altering the climate, but maybe we are.

If we have concerns about storing waste, how do you propose to re-alter and change and restore the climate of the earth over time? And I think it simply means that we've got to stop or at least limit the use of

carbon-based fuels and combustion reaction, and the only answer we have for that right now is nuclear.

Now, that's not to say we're going to provide entire nuclear coverage for the United States. France produces about 75 percent of their energy that way. But we have must have that option. If we abandon that option in this country we're going to be severe polluters of the planet, and we'll have some big problems.

In other countries such as China and others which will make the big difference in the sense of environmental consequence and impact on the earth, we're going to have a profound impact over the next few decades.

I think it can be done safely, no question about it. We need to review it carefully, any of these activities. It was mentioned here that we might have something on the order of --

MR. BROWN: Your time is just about out.

...4 MR. SANDQUIST: I see. But we ship a lot of hazardous materials. Gasoline travels over I-70 in cars every day, and we have to control it, and we're careful.

And the highway patrol tries to keep it safe. But I think we can do this safely, and I invite you to be fair minded and open and consider the requirements of what we need to

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do in the future. Thank you.